

PROCEEDINGS
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A NEW DWARF SALAMANDER OF THE GENUS
BOLITOGLOSSA (PLETHODONTIDAE) FROM
COSTA RICA

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Amongst several apparently unique plethodontids in the collection of the Museo de Zoología, Universidad de Costa Rica (UCR), one, due to the somewhat unusual circumstances of its discovery, can be described at the present time. The specimen was taken by the author from a mat of liverworts, *Hepatica foliosa*, adhering to a small branch which had evidently fallen recently, and was accompanied by eggs, thus reasonably establishing it as an adult.

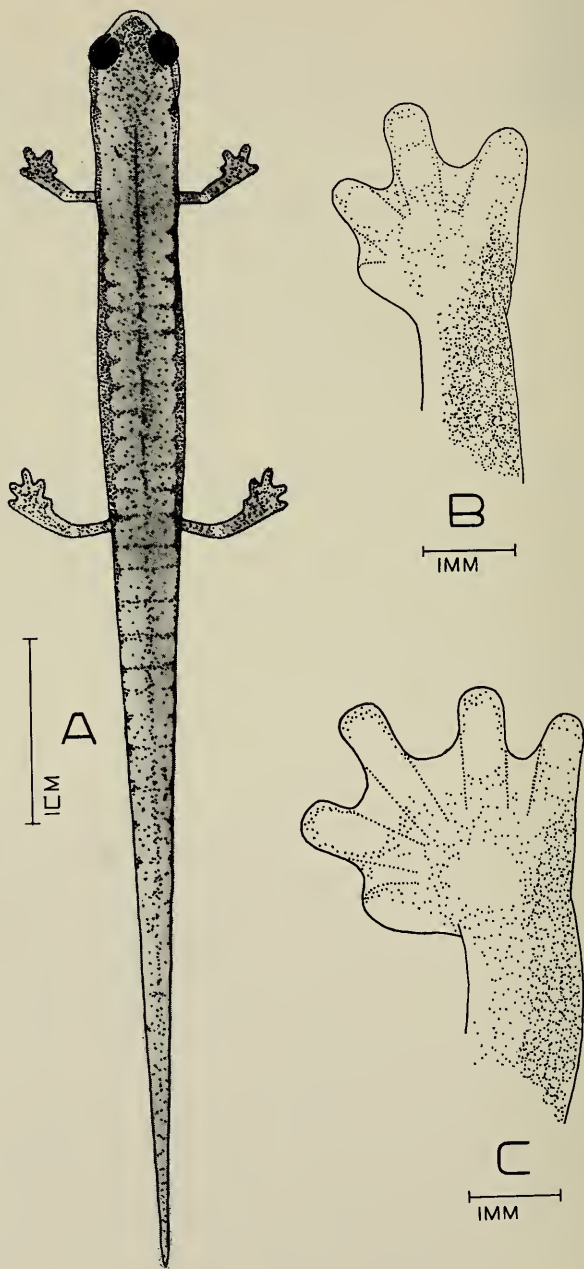
Bolitoglossa diminuta, new species

Figure 1

Holotype: UCR 5217, an adult female from Quebrada Valverde, a precipitous stream 8.8 km NE by road from the bridge crossing the Río Grande de Orosí near Tapantí, Cartago Province, Costa Rica at an altitude of approximately 1555 m, taken by Douglas C. Robinson on August 11, 1968. The stream is neither named nor shown on available maps. The exact site of the stream was determined from aerophotos to be 9° 43' 18"N latitude and 83° 41' 48"W longitude.

Additional Material: Two unhatched and five hatched salamanders, taken as eggs with the adult, are specified as non-paratypic corroborative material in the Museo de Zoología.

Diagnosis: The species is assigned to the genus *Bolitoglossa* on the basis of the presence of 13 costal grooves (counting one each in the axilla and groin) and the absence of a discernible sublingual fold. *Bolitoglossa diminuta* is immediately distinguishable from adults of all other described Costa Rican species by its diminutive standard length (SL), 31.1 mm. *Bolitoglossa epimela* and *B. colonea* are relatively small species, adult females of which usually exceed 40 mm SL. The



first may be further distinguished from the new form by its much more fully webbed digits, while the second has a distinctive inter-orbital crest. Other small species (average or unique female SL less than 40 mm) thus far known in the genus are *B. cuchumatana* (Guatemala), *B. minutula* (western Panamá), *B. peruviana* (Peru) and *B. rufescens* (México to Honduras). The type of *B. riletti* from México was reported to be 31.9 mm snout-vent by Holman (1964). The sex was not mentioned and a cited table of additional measurements of the original series was apparently inadvertently omitted. Wake and Brame (1969) however, place the species in the *rostrata* group stating that ". . . the members of which are large . . ." It will not be further considered here. *Bolitoglossa chica*, previously believed to be diminutive (Wake and Brame, 1963) has been shown by Neill (1964) to reach 50 mm snout-vent in a female lacking maxillary teeth. Either of these traits distinguishes that species from the new form. *Bolitoglossa cuchumatana* has a much shorter tail (41% of total length, *B. diminuta*, 53%, both females). *Bolitoglossa minutula* has a shorter tail ($\text{♀} \text{♀}$ -48%), more digital webbing and a higher number of maxillary teeth (range: 33-51; \bar{x} = 41.7 for females, 34 in *B. diminuta*). The patterns are also distinctive, although highly variable in *B. minutula* (Wake, et al., 1973). The type of *B. peruviana* has 30 vomerine teeth (12 in *B. diminuta*) but a second specimen tentatively assigned to this species by Brame and Wake (1963) has only 13. Pending better definition of this form, it would seem that locality alone would suffice to insure its distinctness. *Bolitoglossa rufescens* has much more extensively webbed digits and differs in numerous other traits.

Description of Holotype: Adult female, snout moderately short. Nostril small; no labial protuberances of nasolabial groove. Canthus rostralis weakly developed. Standard length 6.5 times head width; standard length 3.9 times snout-gular fold length. Deep groove below eye extends from a point below anterior corner of eye to a point slightly anterior to posterior corner and following curvature of the eye, without communicating with lip. Eye moderately large. A well defined postorbital groove extends posteriorly from eye becoming continuous with the dorsal-lateral band. From this groove, a ventral ramus descends 1.5 mm behind eye, and crosses 2.8 mm anterior to the gular fold to the opposite side. Vomerine teeth 12, arranged in single row of 6 on each side, extend from posterior border of choanae in strongly arched curve toward midline, separated from parasphenoid

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FIG. 1. Dorsal views of (A) *Bolitoglossa diminuta*, new species, (B) front foot, (C) hind foot, all of holotype, UCR 5217. The drawing of the hind foot is based on the left foot, due to an aberrant condition of the right foot.

tooth patch by 0.7 mm. Premaxillary teeth 3, maxillary teeth 34 (17-17) extending posteriorly to a point parallel to the midpoint of the eyeball tunic. Tail long, 1.14 times standard length, not strongly compressed laterally, with a weak basal constriction. Postiliac gland not evident. Limbs of medium length, three costal grooves exposed between adpressed limbs; standard length 4.7 times right forelimb, 4.6 times right hind limb, and 10.7 times right foot width; hands and feet about two-thirds webbed, the inner digit of both hand and foot completely included in web, the remaining digits freely projecting (Fig. 1B, C), subterminal pads weak, more evident on feet. Fingers in order of decreasing length: 3, 4, 2, 1; toes in order of decreasing length: 3, 2-4, 5, 1. The second and third digits of the right hind foot appear somewhat joined, an apparently aberrant condition, for which reason the left foot has been illustrated, and inverted to facilitate comparison with other descriptions.

Measurements (in mm): Head width 4.8; snout to gular fold (head length) 8.0; head depth at posterior angle of jaw 2.9 (specimen preserved with mouth opened); eyelid length 2.1; eyelid width 1.2; anterior rim of orbit to snout 1.9; horizontal orbital diameter 1.6; interorbital distance 1.7; distance between vomerine teeth and parasphenoid tooth patch 0.7; snout to forelimb 9.6; distance separating internal nares 1.0; distance separating external nares 1.4; snout projection beyond mandible not determined (mouth opened); snout to posterior angle of vent (SL) 31.1; snout to anterior angle of vent 28.6; axilla to groin 17.1; tail length 35.3; tail width at base 2.6; tail depth at base 2.7; forelimb length 6.6; hind limb length 6.7; width of right hand 2.3; width of right foot 2.9.

Coloration in Alcohol: The dorsum of the head and trunk is brown. Lateral darker brown bands extend from the posterior margin of the orbit, in a straight line, passing above the forelimb insertions and along the trunk where the darker pigment extends medially in the costal grooves to give a slightly scalloped pattern. The bands pass dorsal to the hind limb insertions and become indistinguishable from the ground coloration on the anterior third of the tail. Elbows and knees lack pigment. Scattered melanophores on the gular region, the ventral region of the trunk, limbs and base of tail, especially dense in the cloacal region and sparse on the distal portion of tail.

Range: Known only from the type locality, in Lower Montane Rain Forest according to the ecological map of Tosi (1969).

Etymology: From the Spanish word *diminuta*, meaning exceedingly small.

Comments: Until more specimens become available, observations on osteology must be deferred. Generic allocation is tentatively to the genus *Bolitoglossa*. The species, by virtue of its low costal groove count, is obviously not a member of the genus *Oedipina*. Although no sublingual fold can be discerned, the species shares a number of characteristics reminiscent of *Chiropterotriton*. These include an un-

usually long, strongly tapered tail, foot structure and webbing, and diminutive size. The species currently known as *Parvimolge richardi* has a totally different foot structure, the digits being fused. If indeed, the only known adult of *B. diminuta* and its eggs fell with the branch from a high tree, it may be some time before the species is rediscovered, a possibility which prompted its description at this time. Some four days passed between the hatching of the first eggs and preservation date of these when two eggs still had not hatched. A hatched salamander measures 8.0 mm snout-vent and 3.2 mm tail length. Other species taken at the locality include *B. epimela*, *B. robusta* and *Oedipina poelzi*.

Sumario: Se describe una nueva especie de salamandra, *Bolitoglossa diminuta* sp. n. (Plethodontidae) de Costa Rica. Junto con *B. minutula* de adyacente Panamá, estas especies constituyen los miembros más pequeños conocidos del género, y pueden distinguirse fácilmente por la presencia de membranas interdigitales mucho más completas en *B. minutula*.

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